

CLAIMS

1. A system for treating wastewater containing organic and inorganic contaminants, free floating hydrocarbons and water, said system comprising:

- a holding tank;
- a separator in fluid communication with said holding tank;
- at least one electrocoagulation cell in fluid communication with said holding tank;
- a first ozone injector intermediate said holding tank and said at least one electrocoagulation cell;
- a separation tank in fluid communication with said at least one electrocoagulation cell;
- a carbon filter in fluid communication with said separation tank;
- a second ozone injector intermediate said separation tank and said carbon filter;
- a discharge tank in fluid communication with said carbon filter; and
- means for re-circulating wastewater through said discharge tank and said carbon filter.

2. The system of claim 1, further comprising:

- a sump capable of receiving said wastewater from at least one manifold port; and
- said holding tank in fluid communication with said sump.

3. The system of claim 1, further comprising:

- a dryer for drying solid material recovered from said at least one electrocoagulation cell and said separation tank.

4. The system of claim 3, further comprising:

- a diffuser intermediate said holding tank and said separator;

said diffuser capable of slowing wastewater velocity to said separator.

5. The system of claim 3, further comprising:

a detection system in said discharge tank;

said detection system capable of detecting said contaminants in said wastewater;

said detection system operable to selectively control said means for re-circulating wastewater.

6. The system of claim 1, wherein said means for re-circulating wastewater is selectively operable.

7. The system of claim 6, further comprising:

an insert in said separator;

said insert in fluid communication with an oil retention tank;

said insert capable of decanting said free floating hydrocarbons from said wastewater to said oil retention tank.

8. The system of claim 7, further comprising:

a dryer for drying solid material recovered from said at least one electrocoagulation cell and said separation tank.

9. The system of claim 8, further comprising:

a sensing and feedback system operable to detect wastewater decanted to said oil retention tank;

said sensing and feedback system operable to selectively interrupt fluid flow to said oil retention tank.

10. The system of claim 1, wherein said at least one electrocoagulation cell comprises at least two spaced plates;

said electrocoagulation cell capable of causing ionization of contaminants in said wastewater.

11. A system for treating wastewater containing organic and inorganic contaminants, free floating hydrocarbons and water, said system comprising:

- a holding tank;
- a separator in fluid communication with said holding tank;
- at least one electrocoagulation cell in fluid communication with said holding tank;
- a first ozone injector intermediate said holding tank and said at least one electrocoagulation cell;
- a separation tank in fluid communication with said at least one electrocoagulation cell;
- a carbon filter in fluid communication with said separation tank;
- a second ozone injector intermediate said separation tank and said carbon filter;
- a discharge tank in fluid communication with said carbon filter;
- a detection system in said discharge tank;
- said discharge system capable of detecting said contaminants in said wastewater;
- said detection system operable to selectively control said means for re-circulating wastewater; and
- means for selectively re-circulating wastewater through said carbon filter and said discharge tank.

12. The system of claim 11, further comprising:

- a diffuser in fluid communication with said holding tank and said separator;
- said diffuser capable of slowing wastewater velocity to said separator.

13. The system of claim 12, further comprising:

- an insert in said separator;
- said insert in fluid communication with an oil retention tank;
- said insert capable of decanting said free floating hydrocarbons from said wastewater to said oil retention tank.

14. The system of claim 13, further comprising:

- a sensing and feedback system operable to detect wastewater decanted to said oil retention tank; and
- said sensing and feedback system operable to selectively interrupt fluid flow to said oil retention tank.

15. The system of claim 11, further comprising:

- a sump capable of receiving said wastewater from at least one manifold port; and
- said holding tank in fluid communication with said sump.

16. A process for treating wastewater containing organic and inorganic contaminants, free floating hydrocarbons, and water, said process comprising:

- collecting said wastewater in a holding tank;
- feeding said wastewater to a separator;
- decanting said free floating hydrocarbons from said wastewater;
- collecting said free floating hydrocarbons for recycling;
- transmitting said decanted wastewater to an electrocoagulation cell;
- a first ozone addition step comprising injecting ozone to said wastewater intermediate said separator and said electrocoagulation cell;
- applying a voltage differential across said electrocoagulation cell;

flowing said wastewater to a retention tank;
separating coagulated solids from said wastewater in said retention tank;
a second ozone addition step comprising injecting ozone into said wastewater intermediate said retention tank and said carbon filter;
filtering said wastewater through an activated carbon filter to remove said organic contaminants;
holding said filtered wastewater in a discharge tank;
detecting said organic and inorganic contaminants remaining in said wastewater;
selectively re-circulating said wastewater through said second ozone addition step, said filtering step, and said holding step until said remaining organic and inorganic contaminants are less than a determined concentration in said wastewater; and
discharging cleaned water.

17. The process of claim 16, wherein said feeding step further comprises:

diffusing said wastewater prior to said feeding step.

18. The process of claim 16, wherein said feeding step further comprises:

feeding said wastewater into a lower portion of said separator; and

filling said separator with said wastewater to a determined level.

19. The process of claim 18, wherein said decanting step further comprises:

drawing off said free floating hydrocarbons from atop said wastewater through a transmission line to an oil retention tank;

sensing said wastewater in said transmission line;

selectively interrupting said feeding step when said wastewater is sensed in said transmission line.

20. The process of claim 19, further comprising:

diffusing said wastewater prior to said feeding step.

21. The process of claim 16, further comprising:

drying solid particles resulting from said electrocoagulation step and said separator step.